

MR1035-1512

Serial No. 10/642,396

Reply to Office Action dated 16 December 2004

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions, and listing of claims in the application:

LISTING OF CLAIMS:

Claim 1 (Currently amended) A method of selecting a mode for the encoding of a macroblock in a video encoder, the method comprising: performing a motion search to select a motion vector; determining a residual error for the motion vector with a plurality of macroblock modes; estimating a coding cost from motion vectors for at least some of the plurality of macroblock modes; and selecting the mode for the encoding of the macroblock based on both the residual error and the coding cost associated with the mode, the step of determining a residual error includes the steps of:

performing a sum of absolute differences (SAD) calculation;

adjusting the SAD calculation based on the coding cost for the

mode;

comparing the adjusted SAD calculation for the mode to another

adjusted SAD calculation for another mode; and

selecting the mode with the lower adjusted SAD calculation.

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Claims 2 - 3 (Cancelled).

Claim 4 (Original) The method as defined in claim 1, wherein the coding cost for an Inter macroblock with zero motion vector is zero.

Claim 5 (Currently amended) The method as defined in claim 1, further comprising the step of using different criteria to calculate the coding cost depending on whether the picture is a B-picture or is a P-picture.

Claim 6 (Currently amended) The method as defined in claim 1, further comprising the step of using different criteria to calculate the coding cost depending on whether the picture is interleaved or is progressive.

Claim 7 (Currently amended) A method of selecting a mode for the encoding of a macroblock (MB) in a video encoder, the method comprising using both an indication for residual error and a coding cost for a motion vector for a mode to determine which mode is selected for the macroblock, the step of using an indication for residual error includes the steps of:

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performing a sum of absolute differences (SAD) calculation;
adjusting the SAD calculation based on the coding cost for the
mode;
comparing the adjusted SAD calculation for the mode to another
adjusted SAD calculation for another mode; and
selecting the mode with the lower adjusted SAD calculation.

Claim 8 (Original) The method as defined in claim 7, wherein the motion vector (MV) is a differential motion vector (DMV).

Claim 9 (Currently amended) The method as defined in claim 7, wherein the step of using an indication for residual error ~~is~~ includes at least partially ~~computed~~ computing residual error by reusing ~~an L1 norm~~ a calculation of sum of absolute values of the residual error from a motion search.

Claim 10 (Cancelled).

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Claim 11 (Currently amended) A video encoder that is configured to select a mode for the encoding of a macroblock (MB), the video encoder comprising means for using both an indication for residual error and a coding cost for a motion vector for a mode to determine which mode is selected for the macroblock, the means for using both an indication for residual error and a coding cost including (a) means for performing a sum of absolute differences (SAD) calculation, (b) means for adjusting the SAD calculation based on the coding cost for the mode, (c) means for comparing the adjusted SAD calculation for the mode to another adjusted SAD calculation for another mode, and (d) means for selecting the mode with the lower adjusted SAD calculation.

Claim 12 (Currently amended) The video encoder as defined in claim 11, wherein the means for using both an indication for the residual error is and a coding cost further includes means for at least partially computed computing residual error by reusing an L1-norm a calculation of sum of absolute values of the residual error from a motion search.

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Claim 13 (Currently amended) A computer program ~~embodied~~ stored in a tangible medium comprising a module with instructions for selecting a mode for the encoding of a macroblock (MB) when executed by a computer, the computer program including instructions for using both an indication for residual error and a coding cost for a motion vector for a mode to determine which mode is selected for the macroblock, the instructions for using an indication for residual error and a coding cost for a motion vector for a mode includes the steps of:

performing a sum of absolute differences (SAD) calculation;
adjusting the SAD calculation based on the coding cost for the
mode;
comparing the adjusted SAD calculation for the mode to another
adjusted SAD calculation for another mode; and
selecting the mode with the lower adjusted SAD calculation.

Claim 14 (Currently amended) The computer program as defined in claim 13, wherein the instructions for using an indication for residual error and a coding cost for a motion vector for a mode includes the step of is at least partially ~~computed~~ computing residual error by reusing an L1-norm a calculation of sum of absolute values of the residual error from a motion search.

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Claim 15 (Currently amended) A circuit configured to select a mode for the encoding of a macroblock in a ~~rate~~ fast and quality efficient manner, the circuit comprising: a circuit configured to perform a motion search to select a motion vector; a circuit configured to determine a residual error for the motion vector with a plurality of macroblock modes; a circuit configured to estimate a coding cost associated with the motion vectors for at least some of the plurality of macroblock modes; and a circuit configured to select the mode for the encoding of the macroblock based on both the residual error and the coding cost associated with the mode, the circuit configured to select the mode for the encoding of the macroblock based on both the residual error and the coding cost associated with the mode including (a) a circuit for performing a sum of absolute differences (SAD) calculation, (b) a circuit for adjusting the SAD calculation based on the coding cost for the mode, (c) a circuit for comparing the adjusted SAD calculation for the mode to another adjusted SAD calculation for another mode, and (d) a circuit for selecting the mode with the lower adjusted SAD calculation.

Claims 16 – 17 (Cancelled).